

III-V COMPOUND SEMICONDUCTOR AND LIGHT EMITTING ELEMENT

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Abstract

PROBLEM TO BE SOLVED: To obtain a light emitting element excellent in emission efficiency and a I-V compound semiconductor for producing the light emitting element.

SOLUTION: [1]. the light emitting element has a multilayer structure of a III-V compound semiconductor represented by a general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ (where, $x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$). The multilayer structure comprises a first layer 8 of n-type semiconductor, a second layer 7 doped with p-type impurities, and third and fourth layers 5, 6 sandwiched by the first and second layers 8, 7. The third layer 5 is disposed on the first layer 8 side while the fourth layer 6 is disposed on the second layer 7 side and connected directly with each other. The fourth layer 6 has larger band gap than the third layer 5 and composed of a III-V compound semiconductor having Mg concentration of 10^{18} cm^{-3} or below and [2]. a light emitting at [1]

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L9 ANSWER 1 OF 1 WPIDS (C) 2002 THOMSON DERWENT

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TI Layered III-V semiconductor structure - with high quality and low defect content, esp. for UV or blue light emitting element.

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A new III-V semiconductor structure comprises a stacked layer sequence of
(a) a 5-90 Angstroms thick first layer of a III-V semiconductor of formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $x, y = 0$ to 6 exclusive; and $z = 0$ to less than 1);
(b) a second layer of a III-V semiconductor of formula $\text{Ga}_x\text{Al}_y\text{N}$ ($x'+y'=1$, $x' = \text{greater than } 0$ to 1; $y' = 0$ to less than 1); and (c) a third layer of a III-V semiconductor of formula $\text{Ga}_x\text{Al}_y\text{N}$ ($x''+y''=1$; $x'' = \text{greater than } 0$ to 1; $y'' = 0$ to less than 1). Also claimed are III-V semiconductor structures comprising a fifth III-V semiconductor layer and the first; fourth and fifth III-V semiconductor layers and the first layer, and the fourth and fifth layers and the first, second and third layers. Further claimed are (i) a process for prodn. of a III-V semiconductor structure; and (ii) a light emitting element with a III-V semiconductor structure as described above.

USE - Used e.g. for UV or blue-emitting LEDs and laser diodes.

ADVANTAGE - The structure has high quality and few defects and allows prodn. of light emitting elements having excellent emission properties.

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